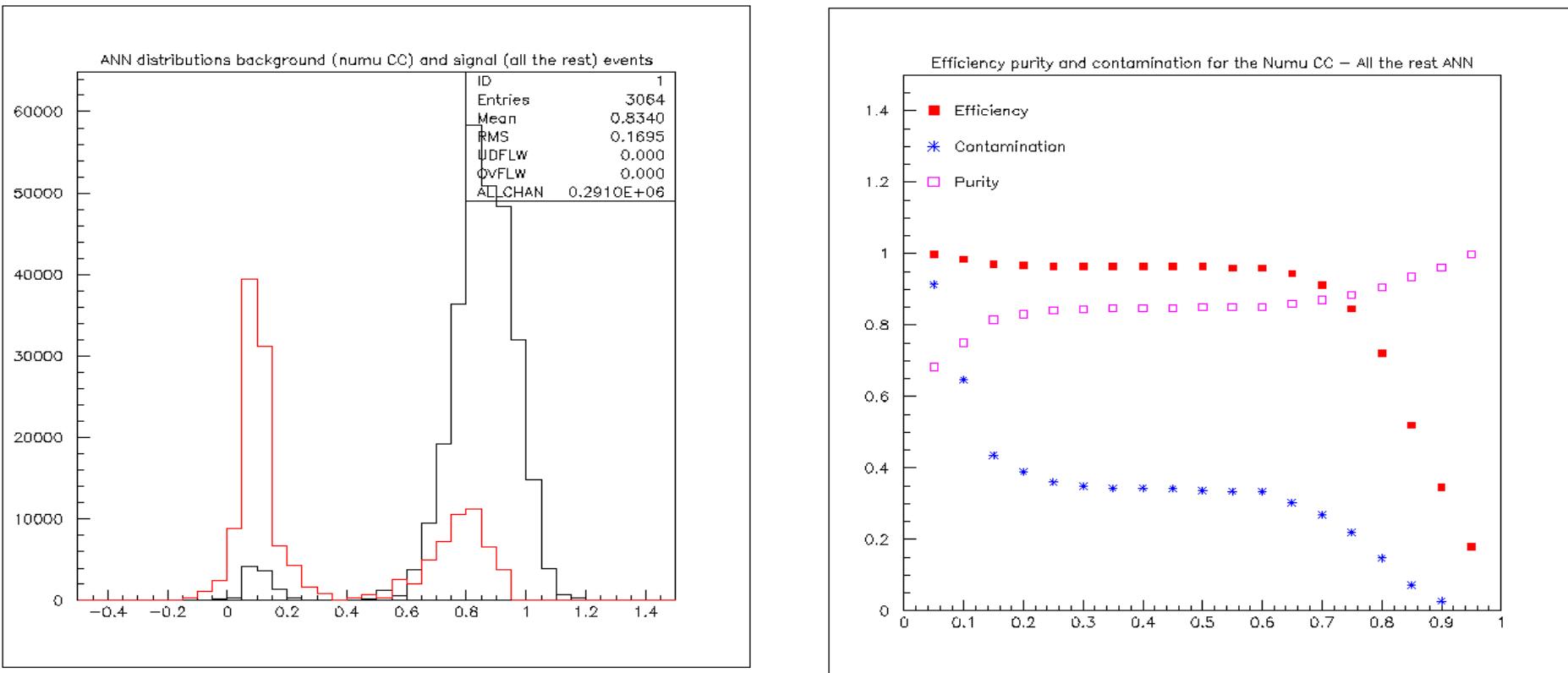


Report on ANN 3

- We present the results of the neural networks for period 1.
- We compare the results of the ANN implementation on period 4 events with the list of April 00.

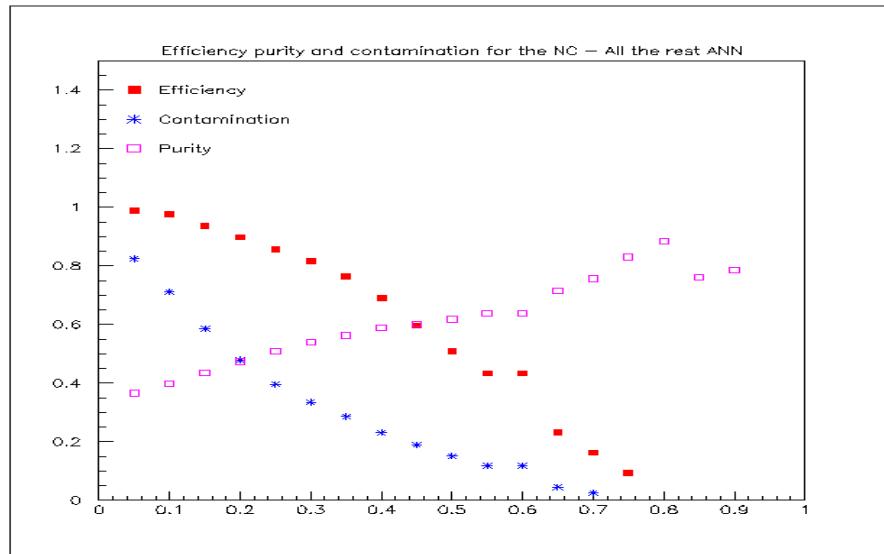
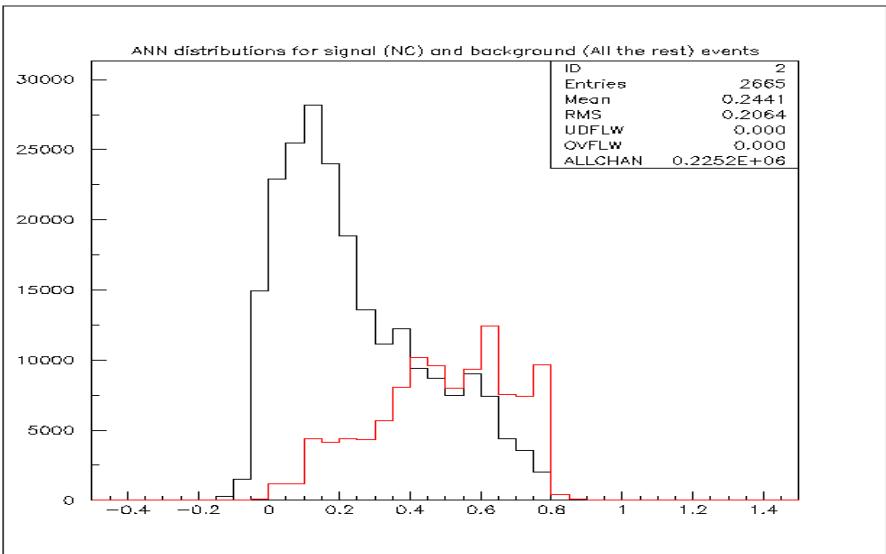
Results on v_μ CC - All the rest (period1)



- With a cut at 0.5 in the selection function produced from the network's output function we select events that are **not v_μ CC** and on the same time events that are **v_μ CC**.

Efficiency $\sim 96\%$ - purity $\sim 85\%$ - contamination $\sim 33\%$

Results on NC - “All the rest” (period1)



- We set cuts at 0.3 0.4 0.5 0.6 to obtain the selection functions for real data

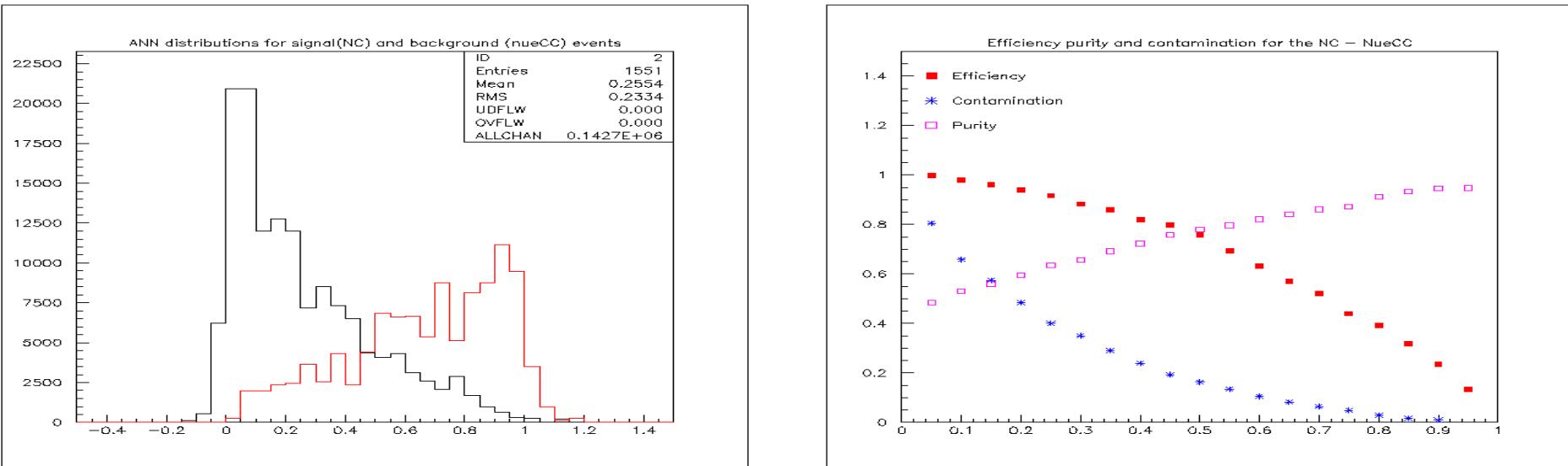
CUT 0.3 : **eff ~ 82% pur ~ 54% cont ~ 33%**

CUT 0.4 : **eff ~ 69% pur ~ 59% cont ~ 23%**

CUT 0.5 : **eff ~ 51% pur ~ 62% cont ~ 15%**

CUT 0.6 : **eff ~ 40% pur ~ 65% cont ~ 10%**

Results on NC - ν_e CC (period1)



- We set cuts at 0.3 0.4 0.5 0.6 to obtain the selection functions for real data

CUT 0.3 : **eff ~ 88% pur ~ 66% cont ~ 35%**

CUT 0.4 : **eff ~ 82% pur ~ 72% cont ~ 24%**

CUT 0.5 : **eff ~ 76% pur ~ 78% cont ~ 16%**

CUT 0.6 : **eff ~ 63% pur ~ 82% cont ~ 10%**

Period 4 ν_μ CC interactions

3276_03366 *	3350_14131 *
3232_03434	3349_15212
3352_03466 *	3296_16049
3290_03529 *	3340_16083
3249_03536 *	3245_17107 electron CC
3230_03860	3315_17199 electron CC
3285_04113 *	3264_17219
3284_04224 *	3292_21438 *
3339_04355	3356_21575
3331_04888	3299_21922 *
3230_05603 *	3345_21951
3352_05679 *	3245_22786 *
3244_07138	3345_23003
3287_07185	3262_23218 *
3351_10406	3261_23533
3296_10500	3267_24207 *
3301_11619 *	3297_25222
3242_11719 *	3353_25590 *
3291_13369 *	3278_25763 *
3358_13933 *	3336_26486
3244_14018 *	3352_30567 *

* Events that are in the Muon CC list of April 00 (Missed 3 from the list)

Period 4 NC interactions 0.3 cut

3284_00315	3225_14772
3250_00470 Electron CC	3228_15365 NC
3317_00693	3267_16322 NC
3255_03664	3245_16327 Electron CC
3333_05853	3235_17215
3235_06686	3298_17712 Electron CC
3358_07808	3278_17752 Electron CC
3359_08038	3261_18428 Electron CC
3253_08684	3291_18579
3350_08796 NC	3330_19742
3331_09076	3225_21089 NC
3240_09118	3267_22046 Electron CC
3299_09529 Electron CC	3335_22286 NC
3331_10854 Electron CC	3288_22591 NC
3331_11197	3261_22883
3235_11264 Electron CC	3261_24198 NC
3289_11309 NC	3247_24351
3260_11519	3262_24891 NC
3345_11919 NC	3339_28485
3299_12702 Electron CC	3352_31223
3230_13227 NC	3223_41138
3258_13907 Electron CC	
3343_13963	

Missed 3 from the April 00 list from which 2 are characterized as NC/el ?

Period 4 not NC interactions 0.3 cut

3231_00431	NC	
3345_00880		
3335_02658		3232_18635 Electron CC
3337_05189		3244_19107 Electron CC
3349_06094		3340_20988
3358_11268		3300_21994 NC/el ?
3253_12208		3263_25102
3224_13443	Electron CC	3245_25887
3261_13539	Electron CC	3286_26982
3257_13542	NC/el ?	3223_46736 NC/el ?
3355_13568		3222_53313 Electron CC
3297_13984	Electron CC	
3297_16057		
3246_16223		
3356_17099		
3333_17665		

**Missed 11 Electron CC from the April 00 list but the contamination is 1
(maximum 4)**

(the 0.3 cut is *efficient* for selecting NC)

Period 4 ν_e CC interactions 0.5 cut

3231_00431 NC	3333_17665
3250_00470 Electron CC	3298_17712 Electron CC
3345_00880	3278_17752 Electron CC
3255_03664	3261_18428 Electron CC
3337_05189	3291_18579
3359_08038	3232_18635 Electron CC
3253_08684	3244_19107 Electron CC
3350_08796 NC	3340_20988
3286_09110 Electron CC	3225_21089 NC/el ?
3240_09118	3267_22046 Electron CC
3299_09529 Electron CC	3335_22286 NC/el?
3358_11268	3263_25102
3224_13443 Electron CC	3353_25590
3261_13539 Electron CC	3245_25887
3257_13542 NC/el ?	3286_26982
3258_13907 Electron CC	3339_28485
3297_13984 Electron CC	3223_41138
3228_15365 NC/el ?	3223_46736
3297_16057	3222_53313 Electron CC
3245_16327 Electron CC	
3356_17099	

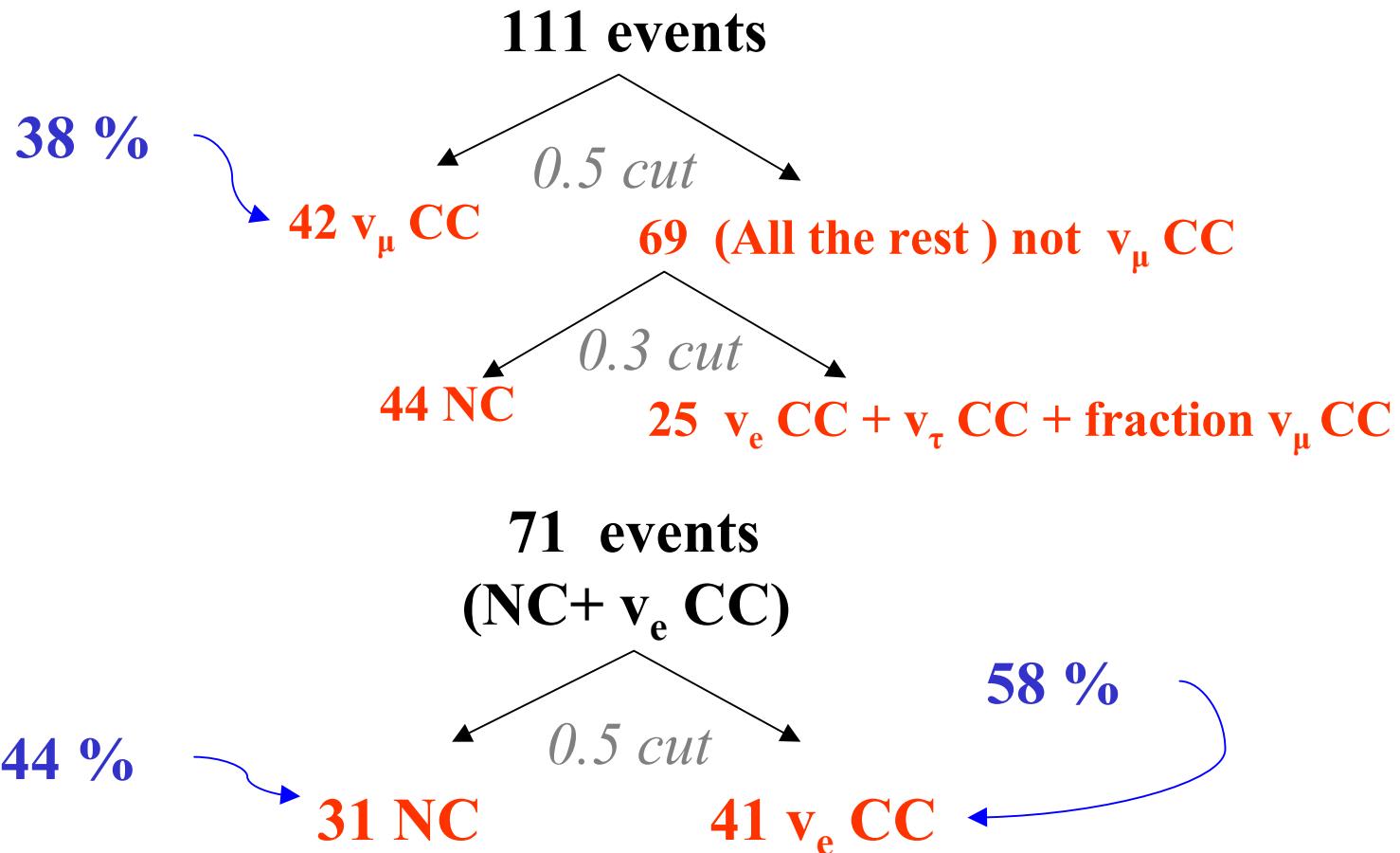
Missed 3 from the Electron CC list of April 00

Period 4 NC interactions 0.5 cut

3284_00315		3355_13568
3339_04355		3225_14772
3333_05853		3340_16083
3349_06094		3246_16223
3358_07808		3267_16322 NC
3331_09076		3245_17107 Electron CC
3331_10854		3315_17199
3331_11197		3235_17215
3235_11264	Electron CC	3356_21575
3289_11309	NC	3300_21994
3260_11519		3288_22591 NC
3345_11919	NC	3261_22883
3299_12702	Electron CC	3261_24198 NC
3230_13227	NC	3247_24351
		3262_24891 NC
		3336_26486
		3352_31223

Missed 2 from the April 00 list of NC events

Summary



Conclusions

- So far we haven't observed any peculiar or unexpected behavior on the implementation of the Neural Networks to real data (given the statistics).
- It seems that the Neural Network that is trained to distinguish NC from v_e CC events is performing in a better way than the NC - "All the rest" although the data set in which it is applied is not strictly "NC + v_e CC".
- The improvement of the NC - "All the rest" Neural Network may come from the usage of new variables.